# 9.0 Opportunities

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# 9.0 Opportunities

## Theme VII: Opportunities

Are there opportunities for improving stock assessments and the stock assessment process?

- This presentation is intended to be a discussion of current and potential opportunities -

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# 9.0 Opportunities

Discussion topics:

1. What research is needed to improve stock assessments, timeliness and relevant research products?
2. How do assessment scientists contribute to peer-reviewed science?
3. What areas of expertise would benefit the Center's assessment portfolio?
4. What new opportunities are available due to new ship and facilities?
5. Can you describe areas where additional collaborations would enhance assessments (e.g. academia, CAPAM, CSTAR, PICES/ISC, MexUS-Pacifico)?
6. How can climate impacts can be incorporated into assessments?

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## 9.1 Opportunities for research to improve stock assessments, timeliness and relevant research products

1. Continued improvement to suite of assessment tools to match need to data and analytical resource availability
2. For groundfish in particular, improvements in data management and distribution, as well as changes to Council review process, could improve timeliness of scientific products
3. For CPS, moving towards a full assemblage assessment including krill will move us towards ecosystem-based management will require additional expertise
4. For all assessment scientists, time to get in the needed research and sponsoring post-doctoral researchers

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## 9.2 Opportunities for assessment scientists to contribute to peer-reviewed science

1. Provide greater internal funding opportunities for assessment scientists to recruit student/collaborator help to address research questions and publish results
2. FATE is one example, but highly competitive. More programs such as recent “Information to Support and Conduct Stock Assessments” would help!
3. Having the IATTC housed in the same building provides the opportunity for “in house” international collaboration
4. Others

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## 9.3 Areas of expertise that would benefit the Center's assessment portfolio

1. A reasonable range of expertise currently, but continuing to get new talent, provide training opportunities for existing scientists, is key
2. Assessment scientists with strong MSE skills would benefit the SWFSC since demand is increasing
3. Balance strong quantitative skills with those with backgrounds in ecology, don't lose sight of process studies and long term improvements to the science
4. Additional expertise needed in model development (staying current), stock structure, ecosystem and climate effects

# 9.4 New opportunities available due to new ship and facilities

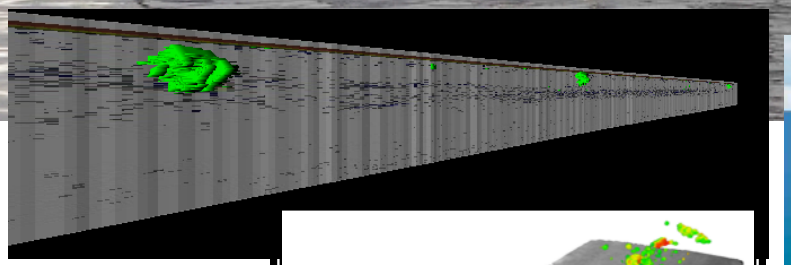
- Five-story, 120,000-square-foot laboratory (total cost ~US$75M, funded by the American Recovery and Reinvestment Act, ARRA)
- The facility has 35 laboratories, including: an experimental aquarium, a large animal necropsy lab, a photogrammetry lab, an ichthyoplankton lab, biotechnology laboratories, a laboratory for the design of ROVs and AUVs.
- The Lab also has a state-of-the-art Ocean Technology Development tech tank; archives containing more than 1.5 million specimens, samples, photographs and recordings; a main library and three additional reference collections; multimedia-equipped conference rooms; and office space for 275 scientists and support staff.

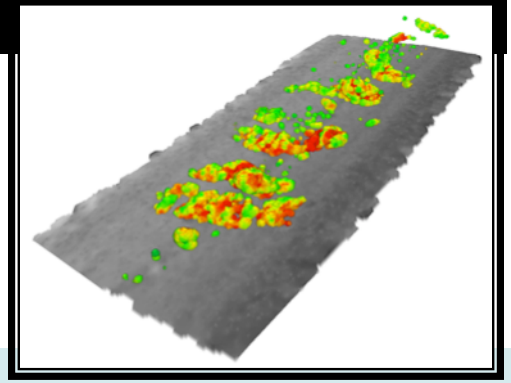
# New labs for advanced technologies

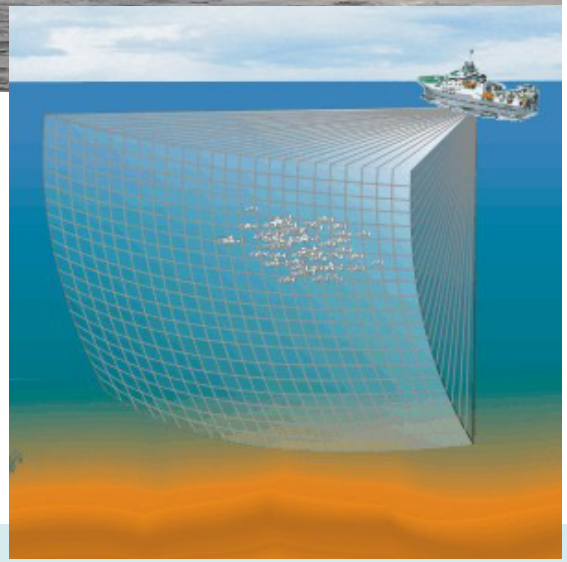
- State-of-the-art tank unique facility:
  - 10 m D x 10 m W x 20 m L  (2 M liters)
  - Thermohaline control (2 - 23°C;  fresh to seawater)
- Saves valuable ship-time
- Development and Testing
  - Sensors: multi-frequency, and multibeam echosounders
  - Autonomous platforms:  tags, landers, buoys, floats, moored arrays, and AUVs
- Science experiments
  - Mammals, turtles, fish, and invertebrates

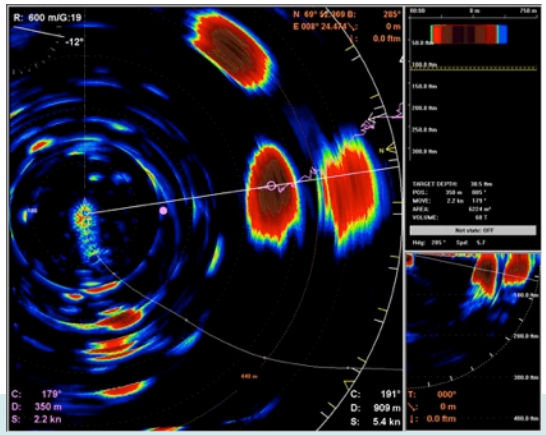
# New FSV to address California Current ecosystem questions


- The Lasker is the fifth in a series of Oscar Dyson-class ships (208 ft; 63m) arrived in San Diego (March 2014)
- Equipped with technologies for fisheries and oceanographic research, including advanced navigation systems, acoustic sensors.
  - Five-frequency split-beam echosounders
  - Scanning, Multi-beam and Imaging Sonars
- The ship is engineered to produce less noise than other survey vessels.









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# 9.5 Opportunities for collaborations and areas where additional collaborations would enhance assessments

A. Academia
   - Graduate student mentors, UCSD, SIO, UCD, USD, SDSU, CICESE, UCSC, Stanford

B. NOAA Initiatives
   - FATE
   - NSAW

C. Assessment Mentoring/Training Programs
   - CAPAM
   - CSTAR

D. International Scientific Meetings
   - PICES/ISC,
   - MexUS-Pacifico, Small Pelagics Meeting (MX)

E. Domestic Scientific Meetings
   - AFS, ESA
   - Tuna Conference (International)

# CAPAM

Center for the Advancement of Population Assessment Methodology

- Established in 2013 to address needs identified in Reauthorization of MSFCMA (2007)
- Supported by **IATTC** - **SWFSC** - **SIO**
- Includes principal investigators, post-doctoral researchers, research associates, collaborators, visiting scientists, advisory panel, administrative support staff
- Mission
  - Research, education, and outreach that addresses animal population dynamics, models, and assessments associated with marine fishery resources
- Objectives
  - Evaluate/improve methods used in fish stock assessment model development and application
  - Afford educational and training opportunities to prepare competent researchers in fishery science
  - Deliverables include research papers, workshops, short-courses/classes, stock assessments
- Main programs currently
  - ***Good practices in stock assessment modeling*** *(selectivity, growth, data/likelihood weighting, diagnostics, etc.)*
  - ***SIO/NOAA education and training for next generation of fishery assessment scientists*** (classes, graduate thesis collaboration, post-doc research)
  - ***Stock assessments*** (state fishery agencies)

CAPAM
Center for the Advancement of Population Assessment Methodology

# Activities

- Good practices in stock assessment modeling program
  - Selectivity workshop
  - Research (post-doc, visiting scientist)
  - *Good Practices Guide* – Selectivity (working group composed of 13 researchers from USA/international)
- Training next generation of stock assessment scientists
  - Various graduate research studies (data-poor assessment methods, tagging, recruitment variability)
- Stock assessment collaboration with partners
  - White seabass assessment (CDFW/PIER)
- Stock assessment short courses (SIO, Argentina, Chile, Miami, Mexico)
- Collaborative efforts (WCSAM-SISAM, ADMB Project, SS model development)
- Upcoming workshop – Modeling growth in fish stock assessments
  - Nov 2014 (SWFSC, La Jolla, CA)
  - Presentations → Papers → Special issue (*Fisheries Research*)

CAPAM
Center for the Advancement of Population Assessment Methodology

# Selectivity workshop

- Held March 11-14, 2013 at the SWFSC in La Jolla, CA
- Sponsors – NOAA, SIO, ISSF
- 75 participants (USA, Canada, Japan, China, Taiwan, S. Africa, Spain)
- 35 participants via remote access available online (WebEx)
- 4 keynote presentations, 21 research presentations, 2 working sessions
- Deliverables
  - Interactive and efficient forum for information exchange
  - Archive of selectivity manuscripts from historical literature
  - Workshop report
  - Special issue in journal (*Fisheries Research* Vol. 158) – 21 manuscripts

# The Center for Stock Assessment Research (CSTAR)

**Key Participants**
Marc Mangel (UCSC, Dept Applied Maths and Stats) and Alec MacCall (former co-chair); John Field (current co-chair) and many other FED and UCSC staff involved

**Objective**
To increase the number of quantitatively trained population biologists who could be hired by NMFS. CSTAR supports undergraduate, graduate and postdoctoral training.

**Funding**
Until recently, NMFS has provided core funding ($1.35M 2001-2012), about $80K/year direct, but no direct (uncommitted) funds in recent years

Mangel and NMFS partners have worked hard to maintain CSTAR funds through other grants (e.g., CA sheephead assessment, CDFW; Antarctic krill life history research and management, Lenfest; transgenerational plasticity, NSF) that helps to support students and post-docs (~$3.9 million since 2001). The uncommitted funds provided essential leverage for many of these proposals

# The Center for Stock Assessment Research (CSTAR)

**Approach**
Match student interests with the work of a NMFS colleague(s) and embed them at NOAA Fisheries where they spend time directly at FED or AERD and in the field

Since fall 2010, CSTAR students, post-docs, and director are fully embedded at FED (another means of building community)

**Accomplishments**
Primary accomplishment is the production of a substantial number of stock assessment and fisheries scientists; of ~5 undergraduate students, ~15 graduate students and ~15 post-docs (including current)…

Many have gone to NOAA or other Gov't FTEs: at SWFSC (Dick, Munch, Satterthwaite, Monk is pending…), NWFSC (Doctor, Stevens, Shelton), SEFSC (Andrews), PIFSC (Snover, now at USGS), NMFS Region (Swank), CSIRO, Australia (Wilcox)

Others to Academia or NGOs: Including (but not limited to) FishWise (Ish), University South Florida (Johnson), Oregon State (Levi), Santa Fe Institute (Yeakel), University California Santa Cruz (Alonzo), University California Berkeley (Carlson)



See more: http://users.soe.ucsc.edu/~msmangel/CSTAR.html

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# 9.5 Opportunities for collaborations and areas where additional collaborations would enhance assessments

**PICES/ISC Proposed Workshop (Oct. 16-26, Yeosu, Korea)**

- Workshop to define a scientific framework to assess the dynamics of pelagic fish under climate variability
    - Pelagic fish survival linked to oceanographic conditions, changes to these conditions can have dramatic impacts to species assemblages and composition
    - Understanding the links between the environment and pelagic fish behavior, growth, recruitment, and production are key to understanding impacts of climate variability

# MexUS-Pacifico Bilateral Meeting July 24-25, 2014

Agenda

- 1. Joint surveys to look at transboundary species along the US west coast, and intercalibration of acoustic-trawl method (the ATM) sampling procedures

- 2. HMS Sharks _ There will be a meeting of the ISC Shark Working Group http://isc.ac.affrc.go.jp/working_groups/shark.html in La Paz at the end of this year)

- 3. HMS Tuna: Pacific bluefin tuna (PBF) was intensively discussed at the IATTC SAC meeting in La Jolla and will be again at the IATTC in Peru and at the ISC in Taiwan

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# 9.5 Opportunities for collaborations and areas where additional collaborations would enhance assessments

D. International Scientific Meetings
   - PICES/ISC, and many others
   - MexUS-Pacifico, Small Pelagics Meeting (MX)

E. Domestic Scientific Meetings
   - AFS, ESA, and many others.
   - Tuna Conference, CalCOFI Conference

F. Commercial Industry Collaborations (see 8.0)
   - Groundfish and CPS EFPs
   - HMS Tuna and shark research

G. Recreational Industry Collaborations (see 8.0)
   - Strong working relationship with recreational industry in San Diego (e.g., barotrauma research, COAST surveys, etc.)

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# 9.6 opportunities to incorporate climate impacts into assessments

1. Both long-term monitoring programs (e.g., CalCOFI) as well as new modeling resources are now available to assessment scientists
2. Data-serving of environmental data has been streamlined considerably (ERDAP)
3. Work with other NOAA lines to broaden “Environmental Intelligence,” perhaps through drawing attention to emerging issues impacting beyond just fishery stocks
    - Climate Change
    - Hypoxia and Ocean Acidification
    - Plastics and marine debris
4. FATE program providing ecosystem analyses and index development
5. Others

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## Strengths

- Long history of robust assessments using reliable tools, including research on ecosystem function
- Prioritization of assessments has been done in close collaboration with PFMC (CPS, Groundfish) and ISC, WCPMC, IATTC (HMS)
- Balance among assessment workload and other important efforts (survey, methods development, research) not always ideal, but is tractable
- Strong working relationships with industry and stakeholders (Collaborative research, Trinational Sardine Forum, Tuna Conference, etc.)
- Others

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## Challenges

- Prioritization for assessments can be ad-hoc, not always perfect agreement of priorities among participants
- Workload is almost always greater than resources, many data needs, analytical support needs, and management responsibilities (PFMC, ISC, NMFS Headquarters) to do the job right
- Retirements causing a large loss of corporate knowledge while filling vacancies has been a very slow process
- Increasing requests for MSEs and ecosystem models that require additional expertise
- Securing resources for CSTAR, CAPAM, and post-doctoral students to aid in assessment research in an era of shrinking resources
- Securing resources for incorporation of advanced technologies into assessments that will aid with climate change and ecosystem effects
- Ability to travel to attend international meetings and collaborate with international colleagues
- Formal transfer of information between international managers
- Increased problems with priority scheduling and reliability of NOAA ships for mandated assessment research
- Others

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## Strategies for Improvement

- Continue to push to fill FTE positions, especially in data management (2013 MSRA priority) to relieve assessment scientists from maintaining large data sets and providing analytical support
- Continue to strive to acquire technical expertise in applied assessment skills (e.g., MSEs, ecosystem effects, climate effects)
- For CAPAM, CSTAR, and academic partnerships continue to embed post-docs and students
- Continue to solicit input from industry and stakeholders for improvement to the assessment process
- Work with other NOAA lines to broaden “Environmental Intelligence”
- Others

# Questons?